The Global (Mis)Allocation of Capital

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The opinions expressed are those of the authors and do not necessarily reflect the view of the Federal Reserve Board, the Federal Reserve System or the IMF.

Two (seemingly Unrelated) Stylized Facts

- **Excess returns** on US net foreign assets: (Gourinchas and Rey 2007, Curcuru, Dvorak, and Warnock 2008) with top down approach (BEA) or market indices: positive, but volatile and imprecisely estimated due to data issues
    - Recent evidence of erosion in excess return due to high U.S. equity returns (Atkeson, Heathcote, and Perri 2022)
- **Factor mis-allocation within countries** (Hsieh and Klenow 2009; Baqaee and Farhi 2020b)

What This Paper Does

- Connect 'P' and 'Q'
- 'P': Universe of US cross border portfolio securities: **official reporting**, all investors/issuers, returns and asset characteristics
  - Settles (for good?) the question of US excess returns on NFA
- 'Q': Links cross border asset holdings to firm wedges (TFPQ, MPK, mark-ups, intangible capital and financial wedges)
  - Document **reallocation to the top** (mostly between firm)

Potential allocative role of cross-border capital flows

Related Literature

- U.S. Excess returns: Gourinchas and Rey 2007, Lane and Milesi-Ferretti 2007, Curcuru, Dvorak, and Warnock 2008, Atkeson, Heathcote, and Perri 2022
- **Mis-allocation, Reallocation to the Top, Superstars**: Hsieh and Klenow 2009, Autor et al. 2020, Baqaee and Farhi 2020b, Gopinath et al. 2017, Varela 2018, Sraer and Thesmar 2023, Bau and Matray 2023, Cingano and Hassan 2022
- **Structural estimates of wedges**: Olley and Pakes 1996, Levinsohn and Petrin 2003, Loecker, Eeckhout, and Unger 2020
- **Allocative role of capital flows**: Lucas 1990, Caselli and Feyer 2007, Gourinchas and Jeanne 2006. Shifts the focus from countries to firms

Results

- Excess return: **positive at 1.8% per year**, due mostly to composition effect (net equity vs. net bond).
  - Divergence of BEA and security-level methods post-crisis
- International equity claims, relative to domestic, **allocate to the top** of TFPQ, mark-ups, MPK, intangible and Sharpe distributions, with lower betas, more so for Asia and BioTech
  - Distributional Consequences: mean and variance of mark-ups increase for more funded sectors (Sraer and Thesmar 2023), firms at top grew more and invest more (when above median TFPQ)
  - Between-firm component (Melitz and Polanec 2015) accounts for 80%; horse race (Fair and Shiller 1990) shows predictive power of TFPQ, MPK and intangibles

Data and Returns

- **Universe** of security-level equities and debt holdings for all cross-border investors, issuers. (TIC; legally mandated reporting)
- Confidential annual data on holdings price, dividend, coupons, starts in 2005
- **Security-level dollar returns**:

$$r_{j,t} = \frac{p_{j,t} - p_{j,t-1} + \text{div}_{j,t}}{p_{j,t-1}} \quad ; \quad r_t^p = \sum_{j=1}^{N} w_{j,t-1}^p r_{j,t}$$

- Correct for **nationality** of firms
- Firm-level matching using Global Compustat and Worldscope

Average Portfolio Returns: Security versus BEA

Excess return positive, equity returns comparable claims/liabilities, bond liabilities lower. BEA approach (Gourinchas & Rey) delivers similar results

Security-Level	2005-2009	2010-2014	2015-2020	Total
Equity return claims	10.27	7.39	10.13	9.32
Equity return liabilities	0.69	17.44	10.80	9.71
Bond return claims	4.89	5.03	4.26	4.70
Bond return liabilities	3.94	5.07	3.29	4.05
Total return differential	5.23	-1.93	1.97	1.77

BEA	2005-2009	2010-2014	2015-2020	Total
Equity return claims	8.42	7.96	8.43	8.28
Equity return liabilities	1.47	13.26	10.73	8.63
Bond return claims	5.16	5.82	6.40	5.83
Bond return liabilities	4.22	3.74	3.45	3.78
Total return differential	4.18	0.09	1.33	1.83

Average Portfolio Returns: Security versus Index

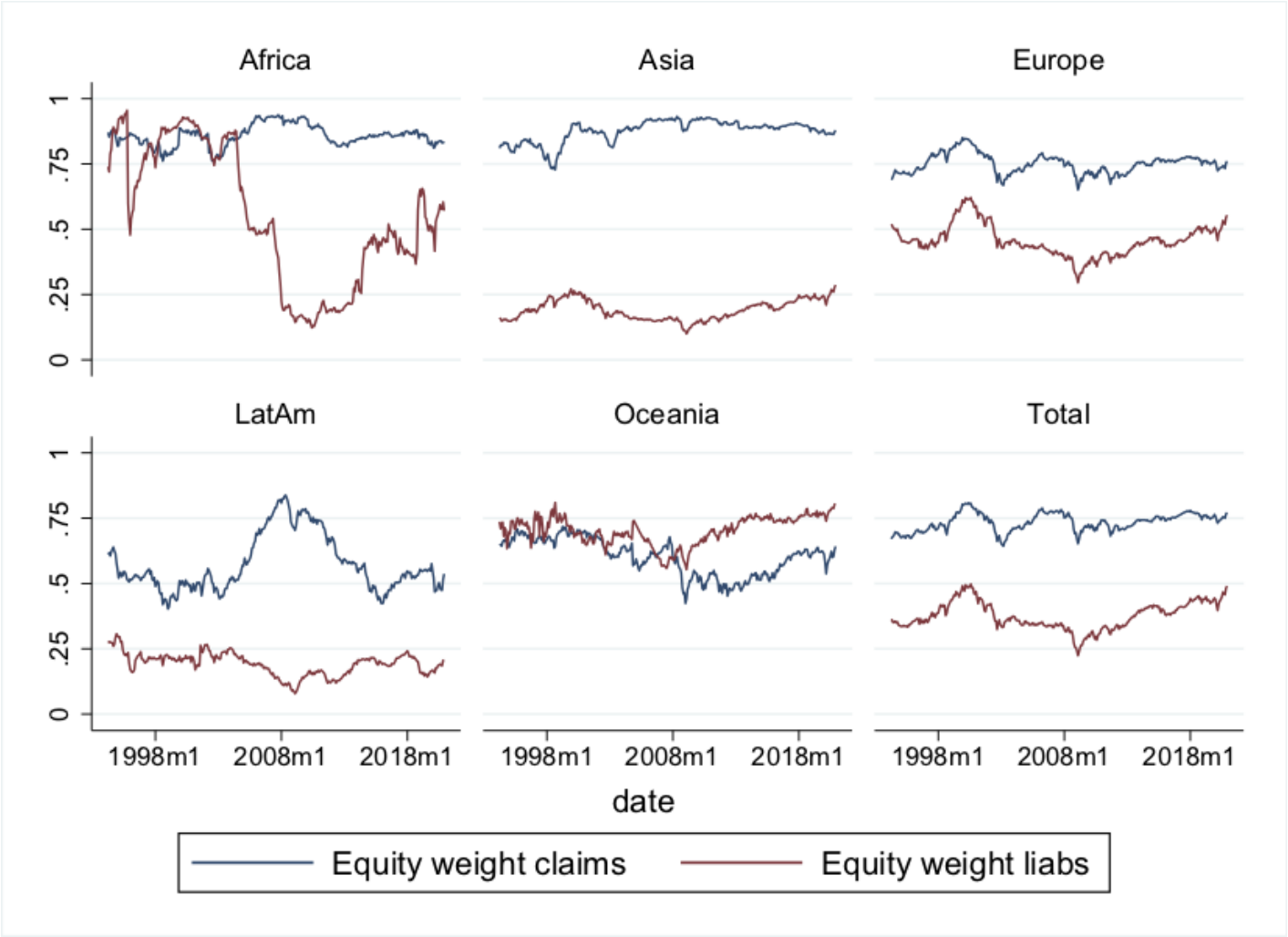
Same in comparison with index approach (Curcuru et al)

Security-Level	2005-2009	2010-2014	2015-2020	Total
Equity return claims	10.27	7.39	10.13	9.32
Equity return liabilities	0.69	17.44	10.80	9.71
Bond return claims	4.89	5.03	4.26	4.70
Bond return liabilities	3.94	5.07	3.29	4.05
Total return differential	5.23	-1.93	1.97	1.77

Index	2005-2009	2010-2014	2015-2020	Total
Equity return claims	11.66	7.22	8.76	9.18
Equity return liabilities	-0.47	19.30	10.33	9.76
Bond return claims	5.62	4.42	3.60	4.49
Bond return liabilities	4.37	4.29	3.29	3.94
Total return differential	6.35	-2.19	1.01	1.68

The Role of Portfolio Composition

Excess return due to composition of portfolio. Claims tilted toward equities (75%), liabilities tilted toward debt



Equity Valuations. Erosion of Excess Return?

Equity Valuation BEA and security-level

Nationality vs. Residency of Firms

- To correctly identify the allocation of excess returns and correct for offshore financial centers (see Bertaut, Bressler, and Curcuru 2019)

- Security-by-security: info on constituents from MSCI, text matching techniques or manually (eg Tencent and Baidu reassigned manually to China) ▸ Nationality top, ▸ Nationality graphs

Nationality vs. Residency of Firms

Average returns and differential. Nationality basis.

Security-Level	2005-2009	2010-2014	2015-2020	Total
Equity return claims	10.37	7.39	8.72	8.83
Equity return liabilities	0.69	17.44	10.94	9.69
Bond return claims	4.94	5.10	3.76	4.60
Bond return liabilities	3.79	5.22	2.52	3.84
Total return claims	8.67	6.59	7.43	7.57
Total return liabilities	2.82	9.41	6.06	6.10
Total return differential	5.84	-2.81	1.38	1.47

Returns: Summary

- US excess return is economically large, robustly estimated, around 1.8 percent (residency), 1.5 percent (nationality)
- Mostly a composition effect. Long equity, short debt
- Returns on equity claims and equity liability comparable
- Significant variation across small periods (erosion)

Firms' Wedges: Structural Estimation

- **Method:** productivity: Olley and Pakes 1996, Levinsohn and Petrin 2003, market wedges: Baqaee and Farhi 2020a and Doraszelski and Jaumandreu 2018; intangibility: Peters and Taylor 2017, Crouzet and Eberly 2023

- **Mark-ups.** $\mu_{jt} = \frac{P_{jt}}{MC_{jt}}$ can be expressed as:

$$\mu_{jt} = \frac{\beta_{Xjt}}{S^*_{Xjt}} \tag{1}$$

  where $S_{Xjt} = \frac{W_{Xjt}X_{jt}}{P_{jt}Q_{jt}}$ is the share of revenues on any given input.
  and $\beta_{Xjt} = \frac{X_{jt}}{Q_{jt}}\frac{\partial Q_{jt}}{\partial X_{jt}}$ is the elasticity of production to input X_{jt}

- Compustat matches better than Worldscope;

- Significant shifts in markup distributions to the right, for the universe of firms, as well as the firms in TIC, for the US and all other regions. ▸ Kernel US ▸ Kernel Foreign

Cross-border Allocation along the Firm Distribution

Univariate Firm Level Specification:

$$\tilde{s}_{i,t} \equiv s_{i,t} - \overline{s}_{i,t} = \gamma + \alpha x_{i,t} + \epsilon_{i,t} \tag{2}$$

weighted by market cap, robust st. er. clustered at firm level

$s_{i,t}$: share of firm i in claims/liabilities portfolio;
$\overline{s}_{i,t}$: market cap of firm i in ROW or US market cap,
$x_{i,t}$: wedge of firm i (Markup, TFPQ, MRPK...)

Horse Race:

$$\tilde{s}_{i,t} - \tilde{s}_{i,t-1} = \alpha + \beta_1(\hat{s}^1_{i,t} - \hat{s}^1_{i,t-1}) + \beta_2(\hat{s}^2_{i,t} - \hat{s}^2_{i,t-1}) + \epsilon_t \tag{3}$$

with predictions from panel specification from training sample 2000-2015

Impact on investment

$$\Phi^i_t[k^i_{t+j} - k^i_{t+j-1} > 0] = \alpha + \beta(\tilde{s}_{i,t} - \tilde{s}_{i,t-1})\mathcal{I}^{TFPQ,t} + \epsilon_t \tag{4}$$

Dynamic Reallocation: Within-Between Decomposition

$$FM_t = \sum_i \tilde{s}_{i,t}\omega_{i,t} \tag{5}$$

where $\tilde{s}_{i,t} = s_{i,t} - \overline{s}_{i,t}$

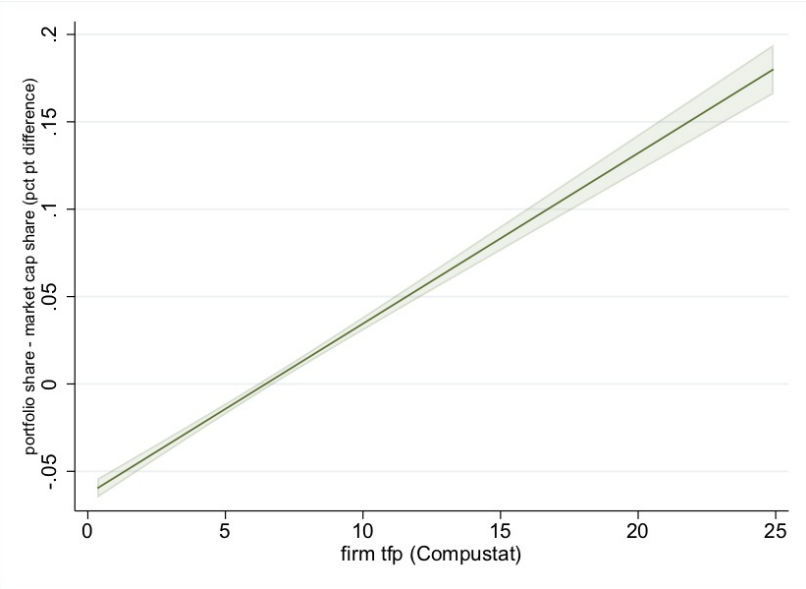
$$FM_t - FM_{t-1} = \sum_i \tilde{s}_{i,t}\omega_{i,t} - \sum_i \tilde{s}_{i,t-1}\omega_{i,t-1} = \tag{6}$$

$$= \underbrace{\sum_i \tilde{s}_{i,t-1}(\omega_{i,t} - \omega_{i,t-1})}_{\text{within term}} + \underbrace{\sum_i (\tilde{s}_{i,t} - \tilde{s}_{i,t-1})\omega_{i,t-1}}_{\text{between term}}$$

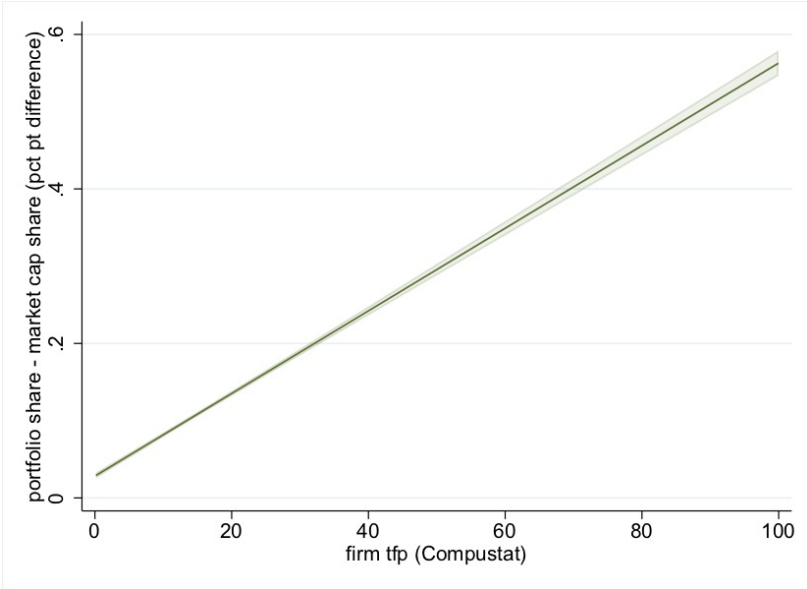
$$+ \underbrace{\sum_i (\tilde{s}_{i,t} - \tilde{s}_{i,t-1})(\omega_{i,t} - \omega_{i,t-1})}_{\text{cross-term}}$$

Allocation to the Top: TFPQ

Allocation to the Top of the Distribution of TFPQ

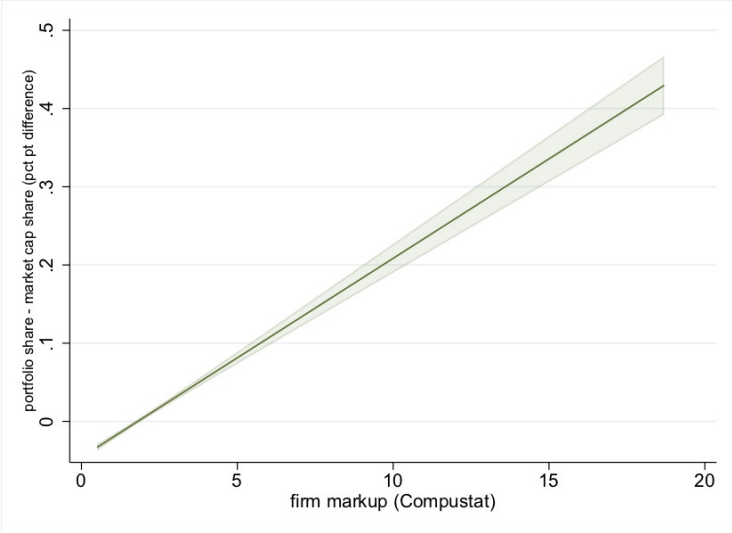


Liabilities



Claims

Allocation to the Top: Mark-ups



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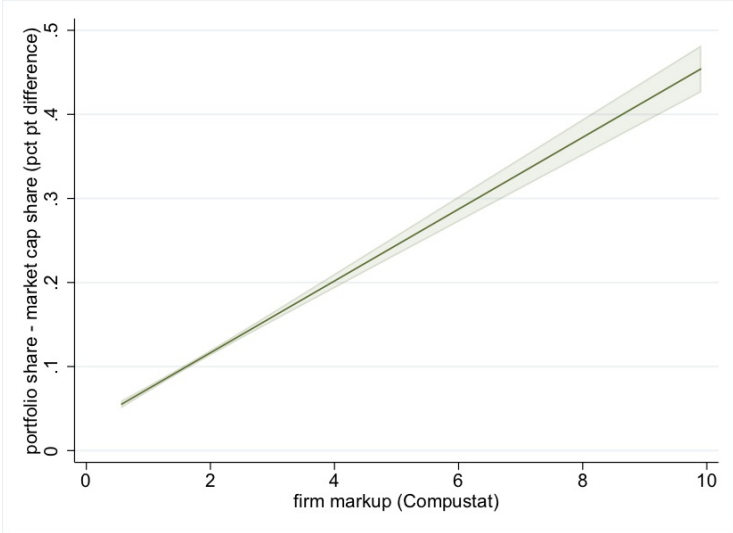
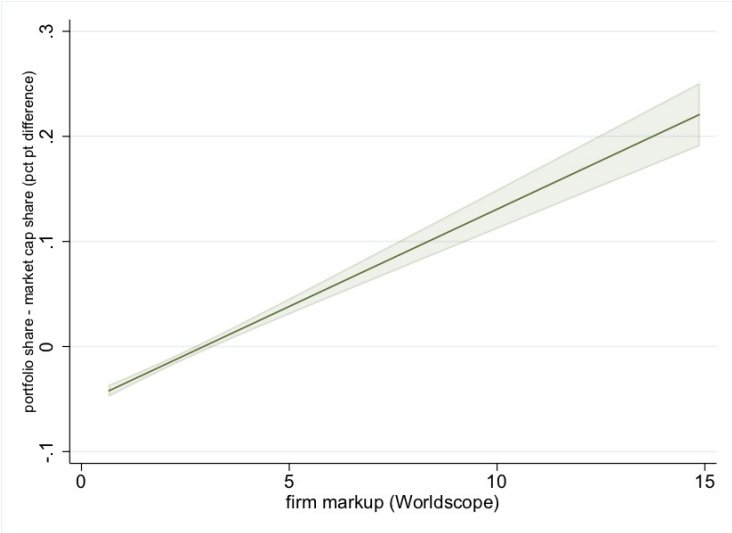
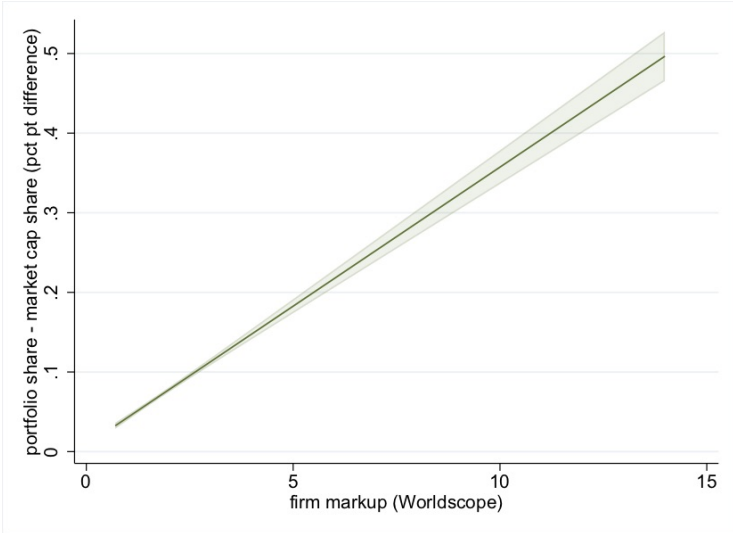


Claims



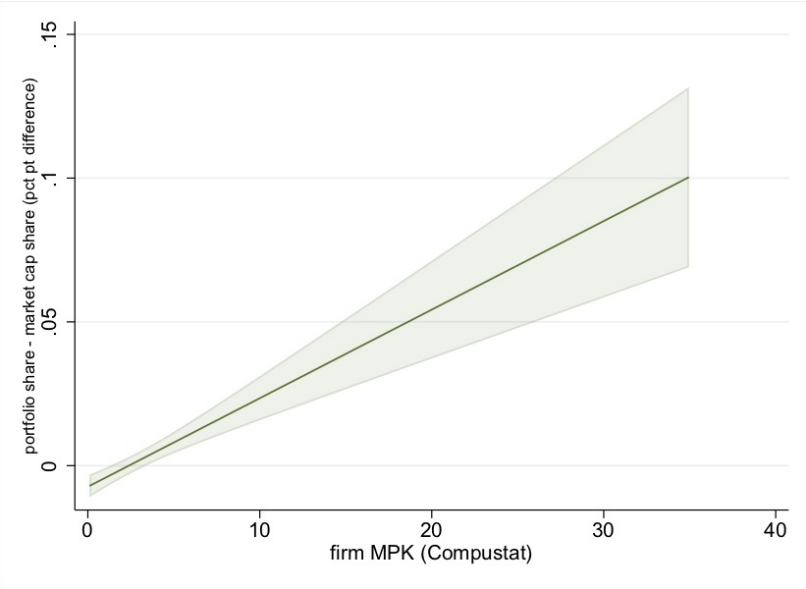
Liabilities



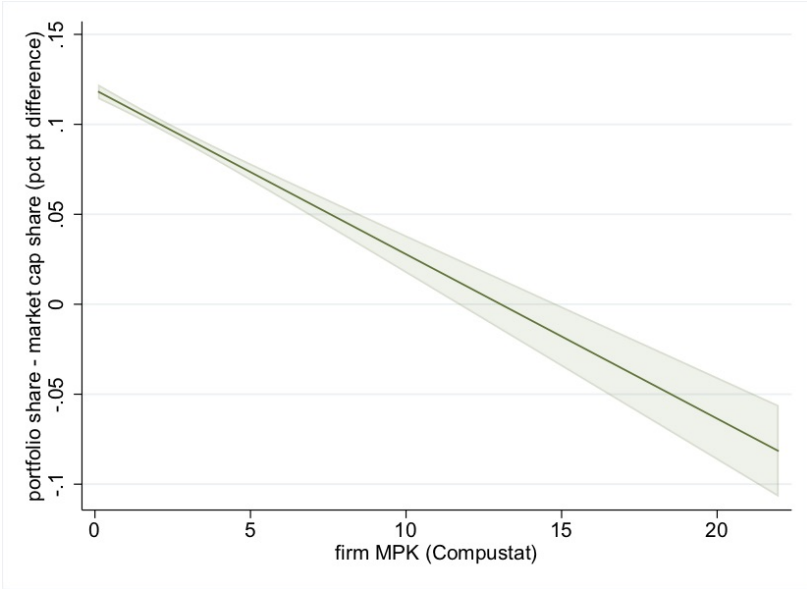
Claims

Allocation to the Top: MRPK

Allocation to the Top for MRPK for liabilities, but not claims



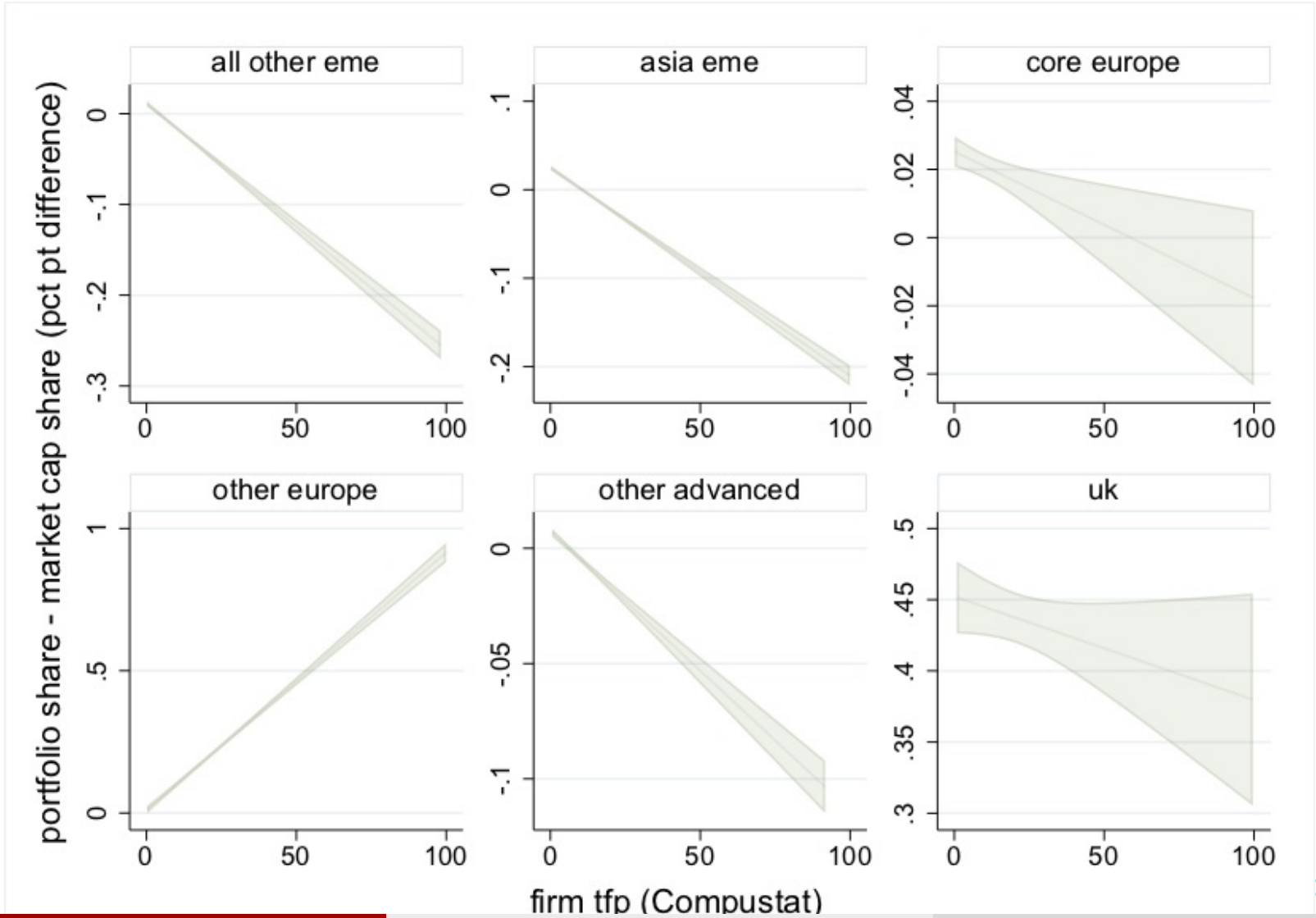
Liabilities



Claims

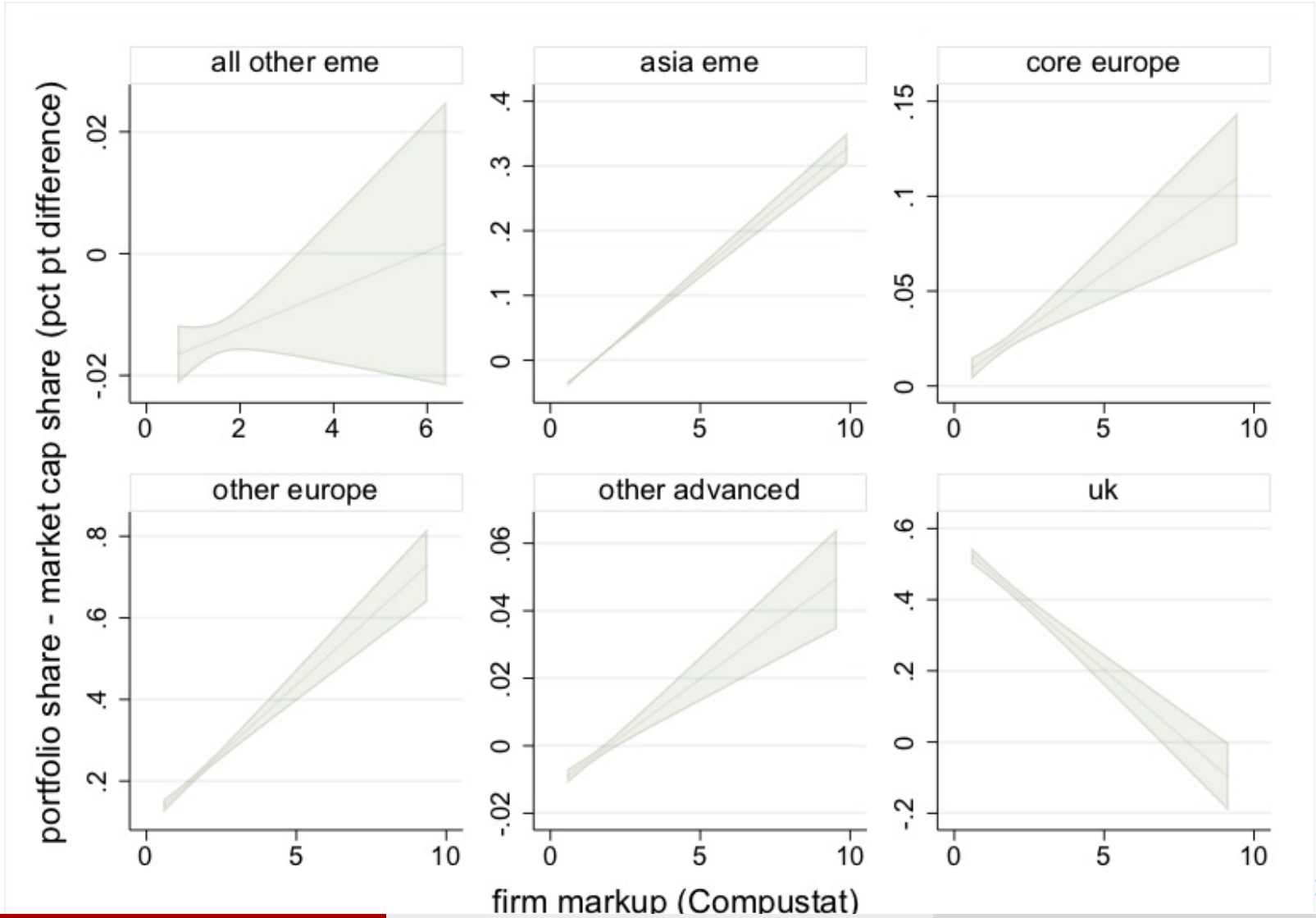
Allocation to the Top: By Region

U.S. shares of European firms have higher TFPQ than other regions

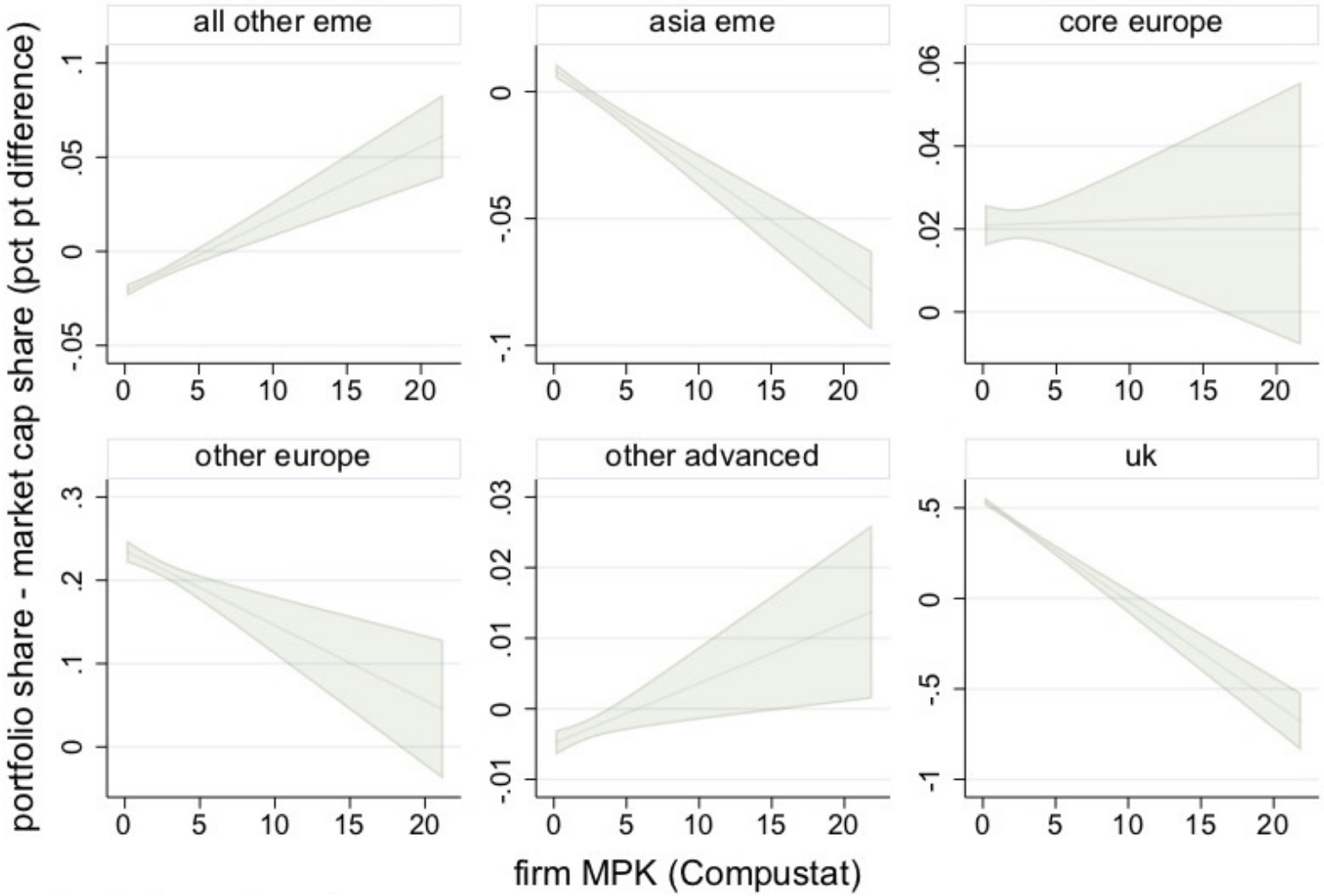


Allocation to the Top: By Region

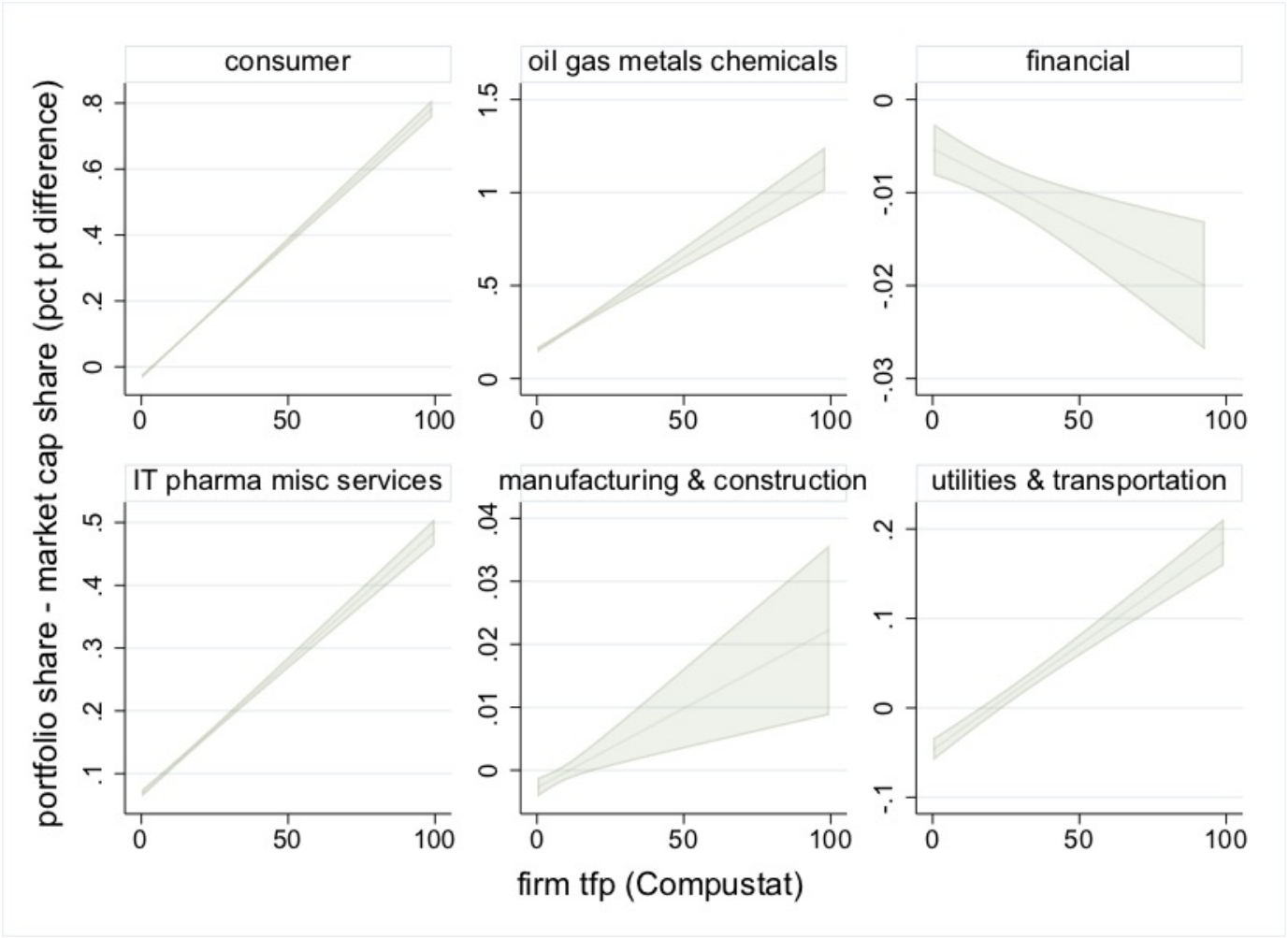
U.S. shares of Asian firms have higher mark-ups than other regions



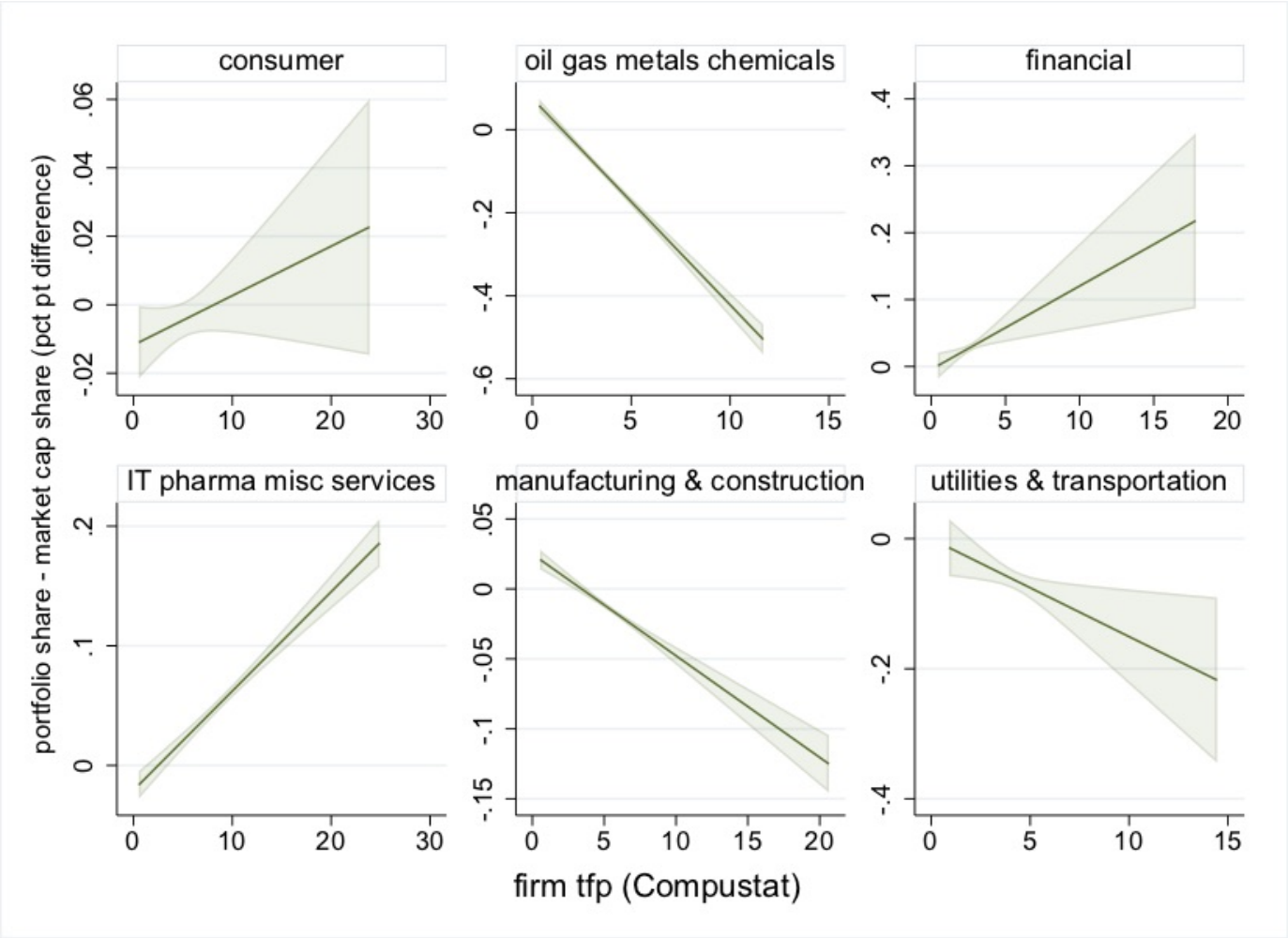
Allocation to the Top: By Region



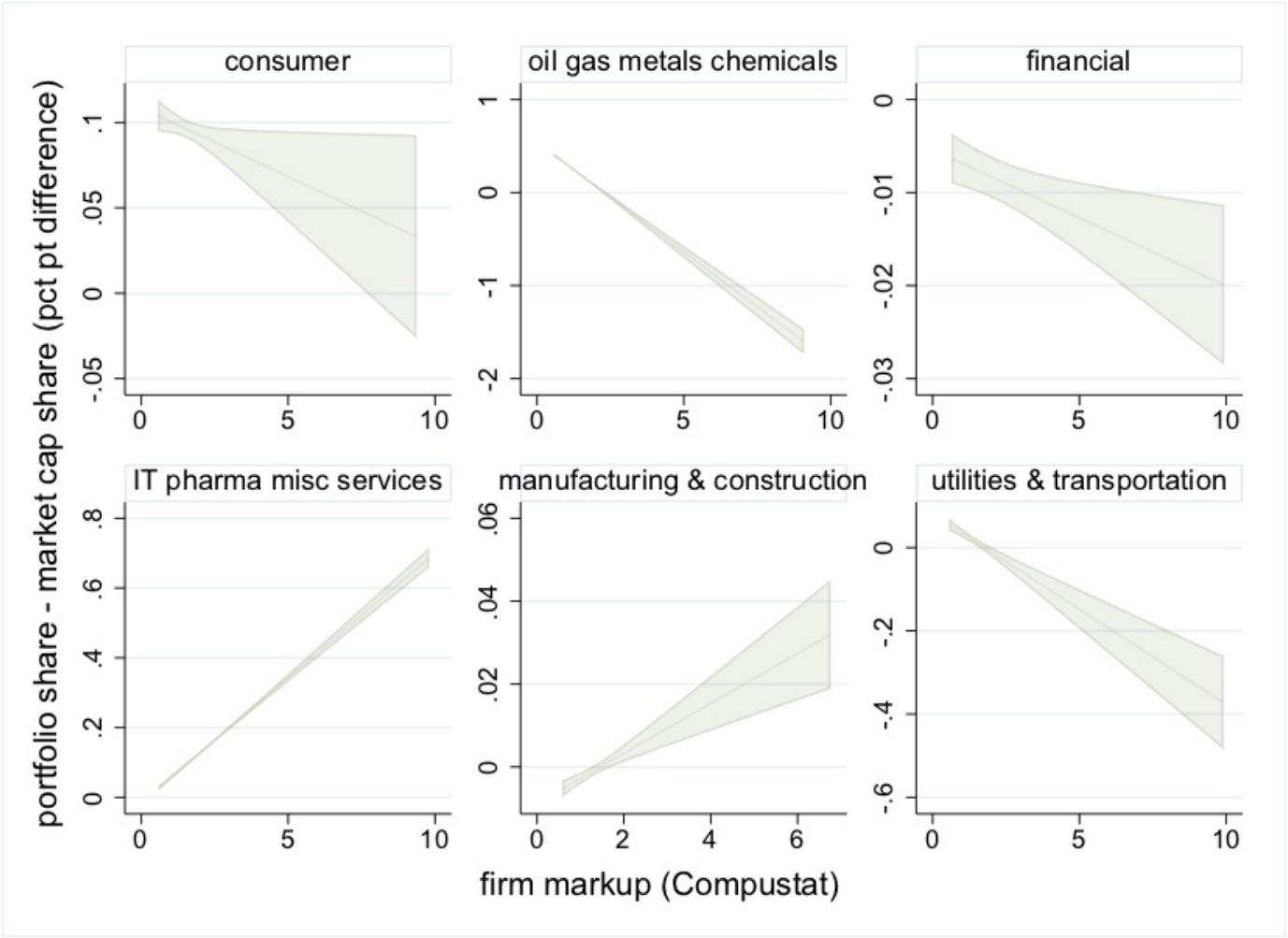
Allocation to the Top of TFPQ: Claims By Sector



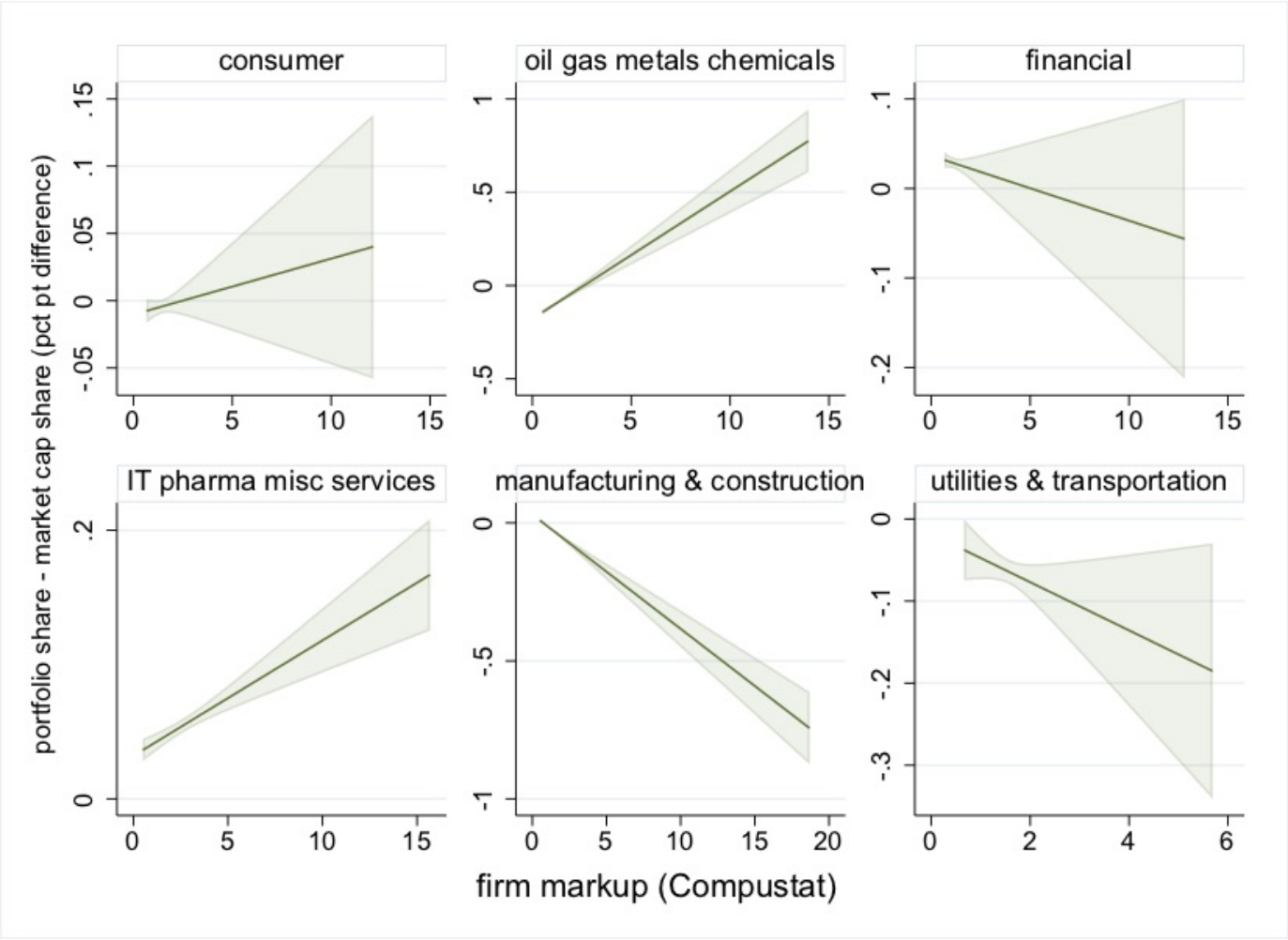
Allocation to the Top of TFPQ: Liabilities By Sector



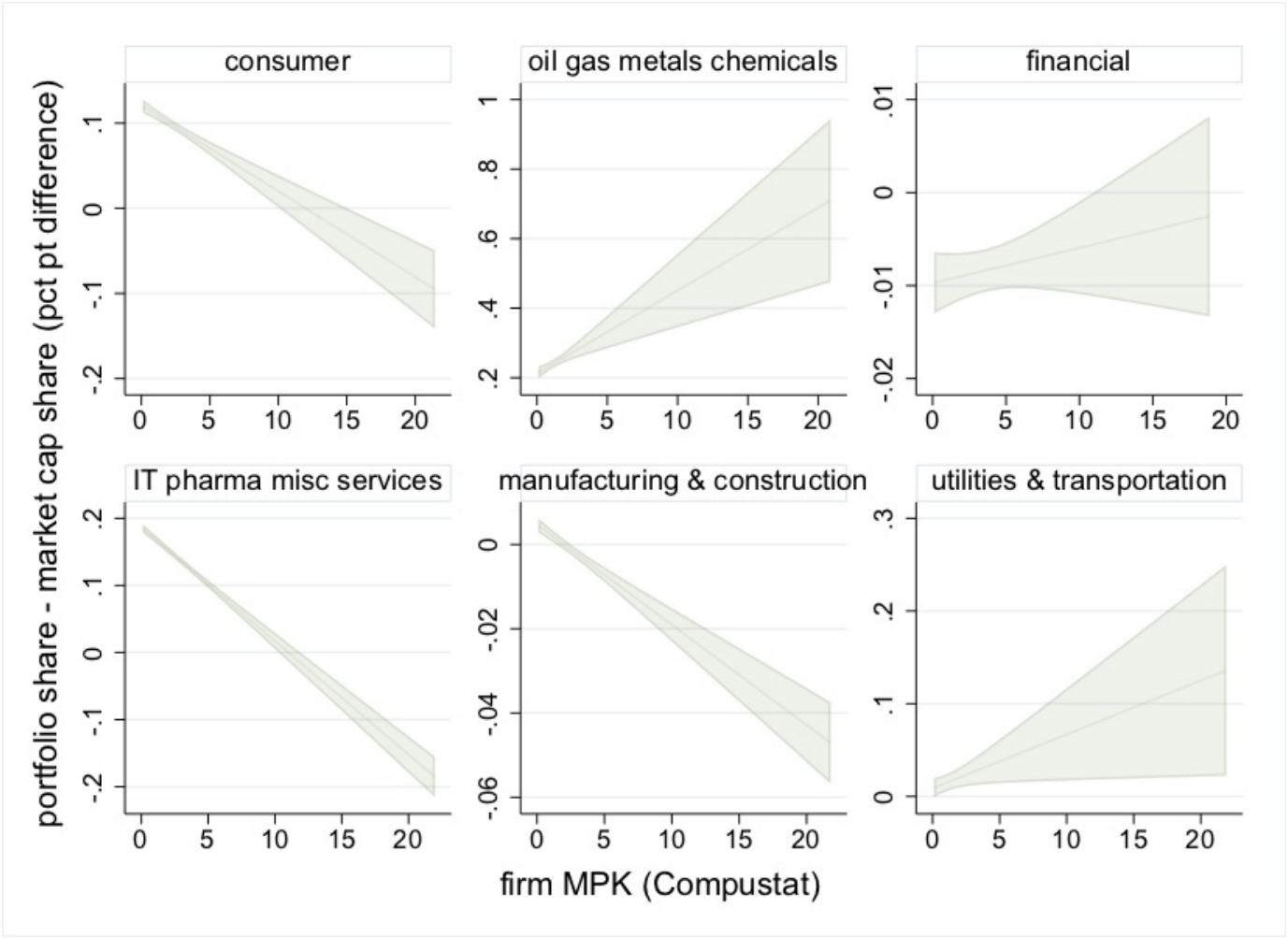
Allocation to the Top of mark-ups: Claims By Sector



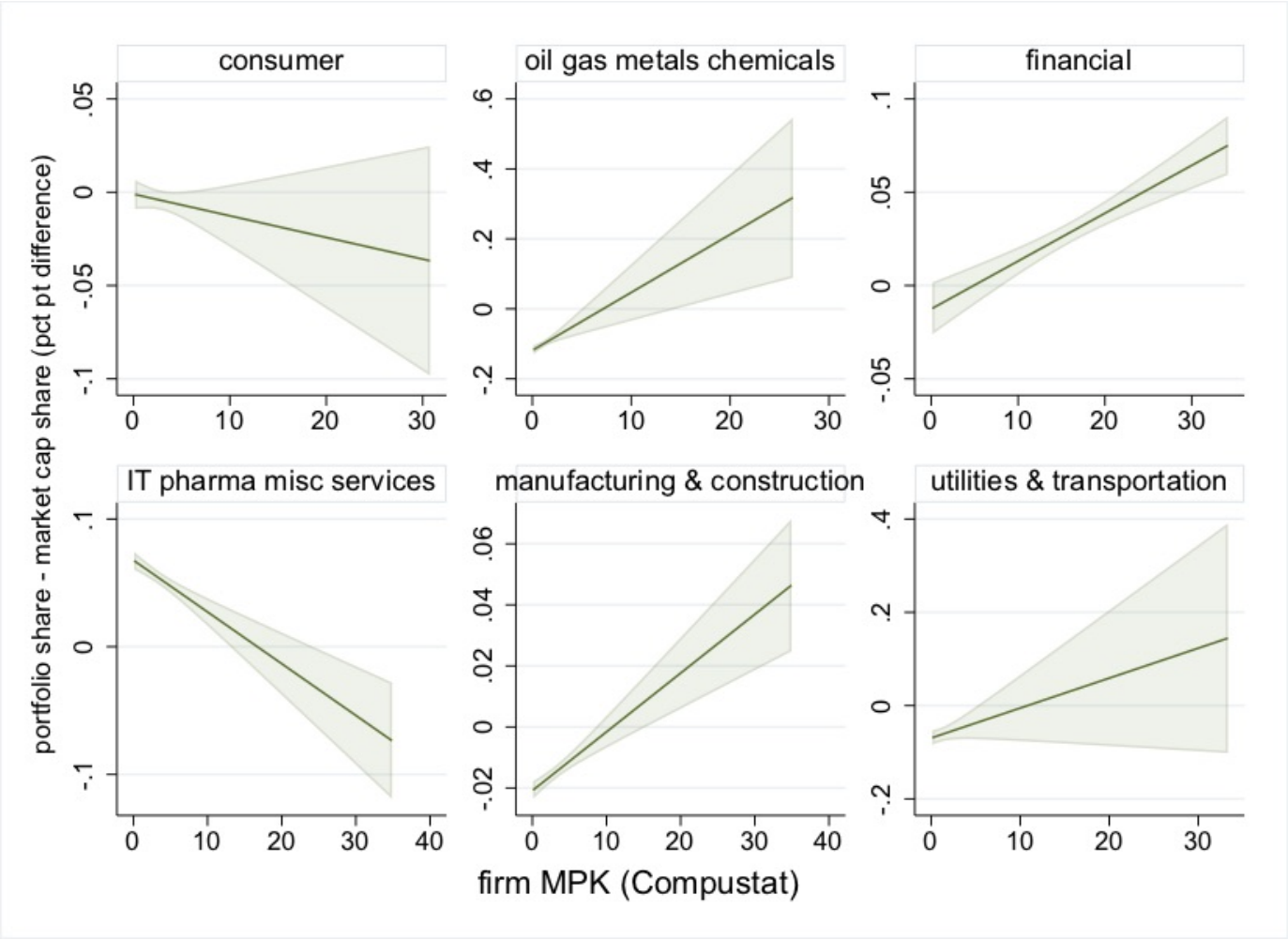
Allocation to the Top of mark-ups: Liabilities By Sector



Allocation to the Top of MPK: Claims By Sector

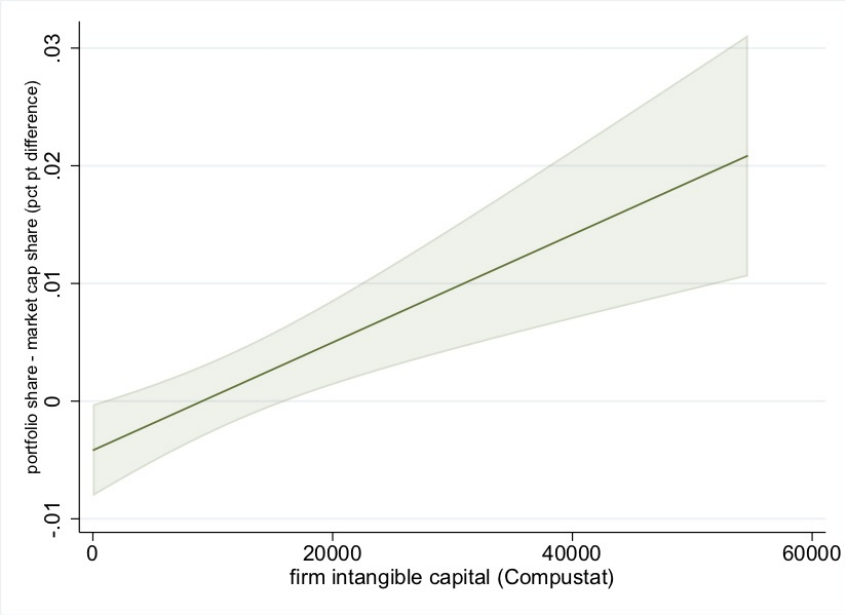


Allocation to the Top of MPK: Liabilities By Sector

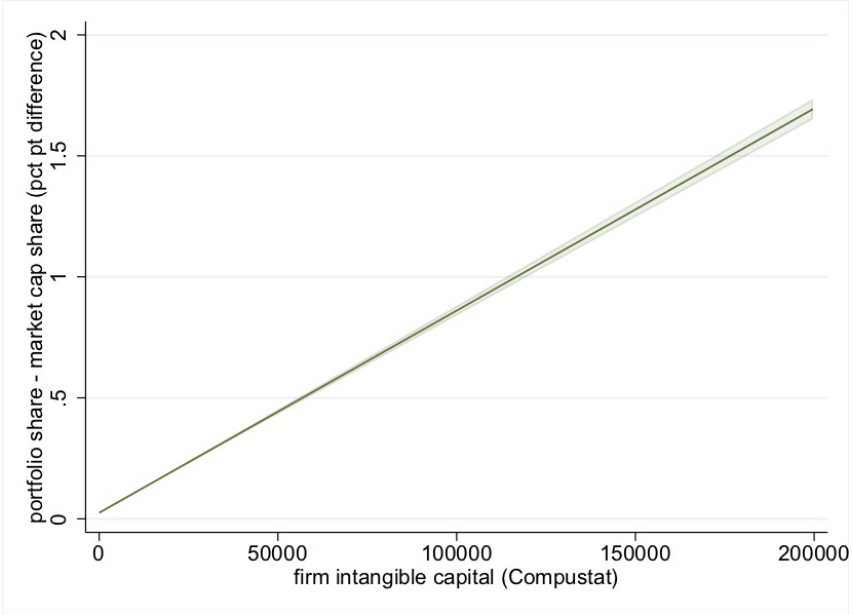


The Role of Intangibles

Claims allocate to firms with high intangibles



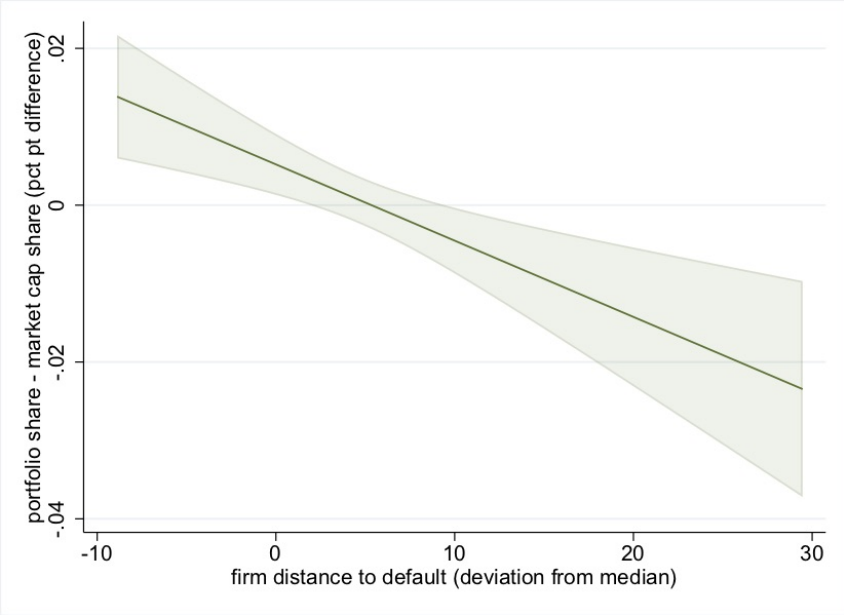
Liabilities



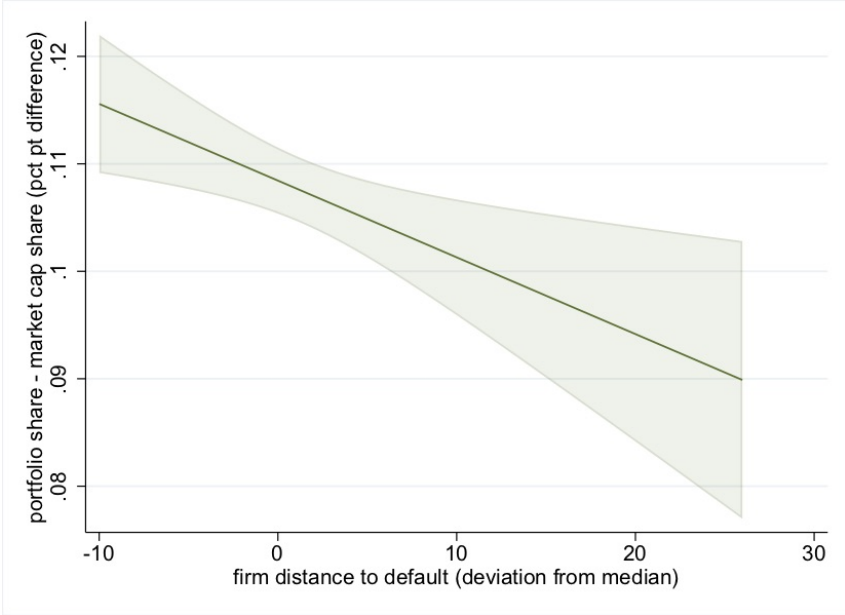
Claims

The Role of Credit Frictions

Allocate to firms with higher probability of default



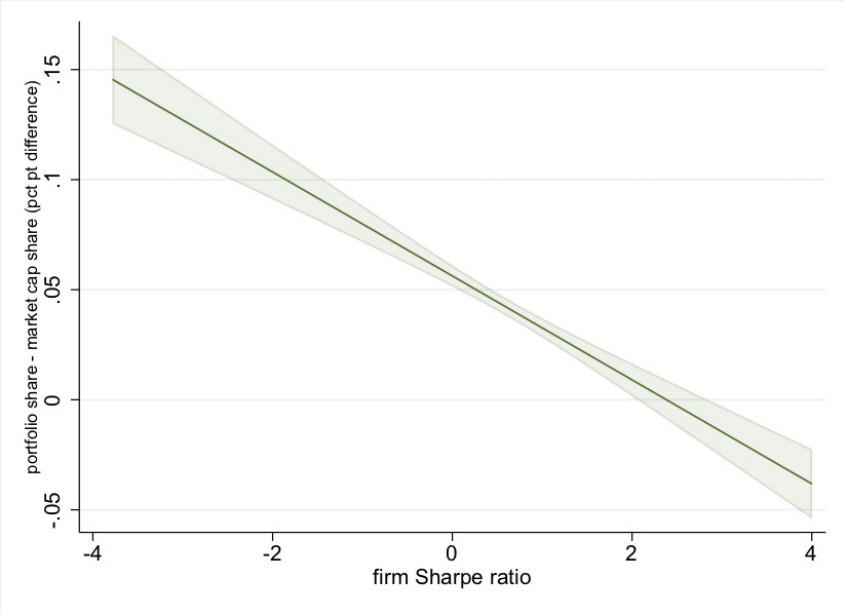
Liabilities



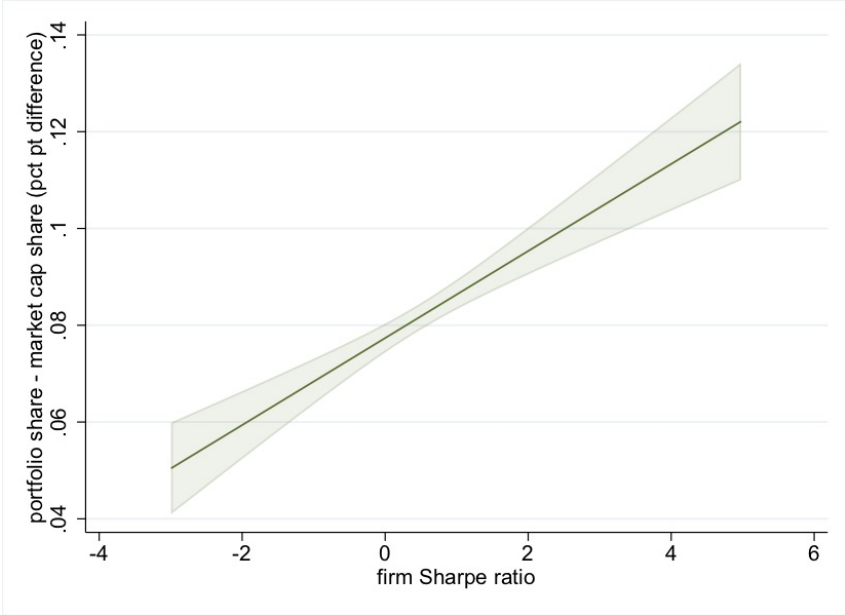
Claims

Allocation to Sharpe Ratio

But U.S. investors get compensated for that, foreign do not

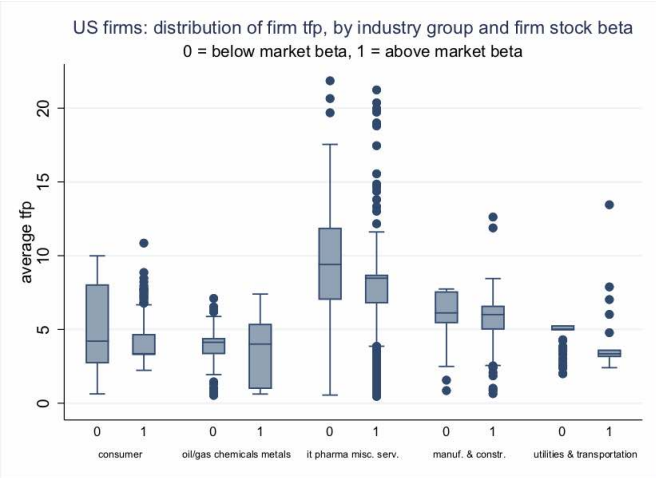


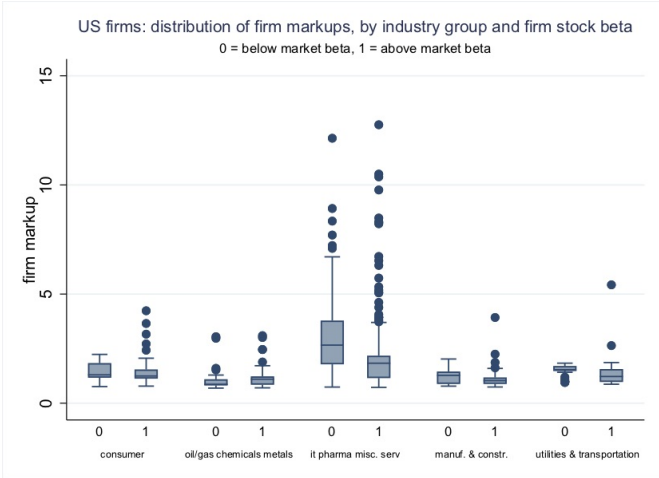
Liabilities

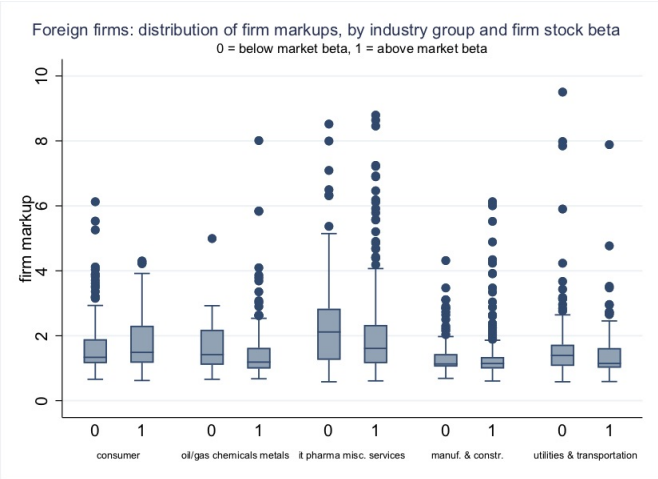


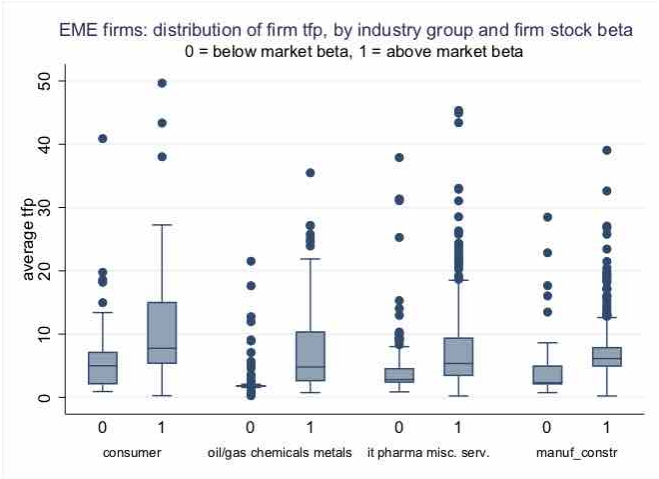
Claims

Investor Incentives



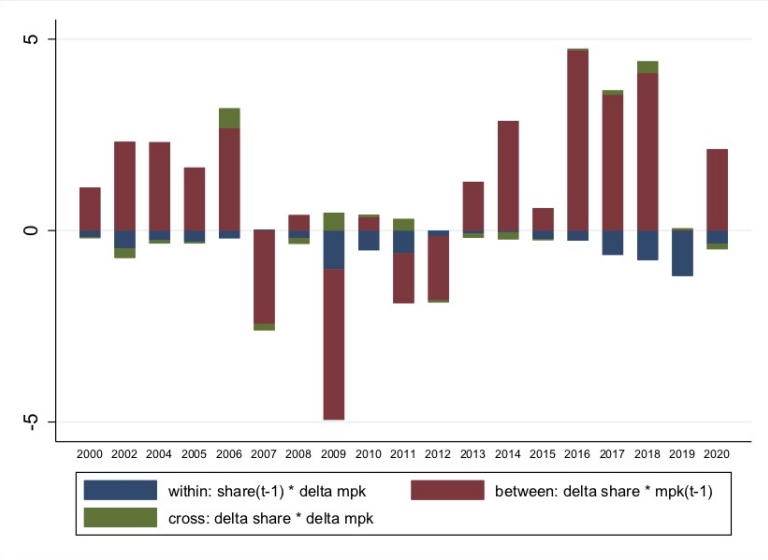


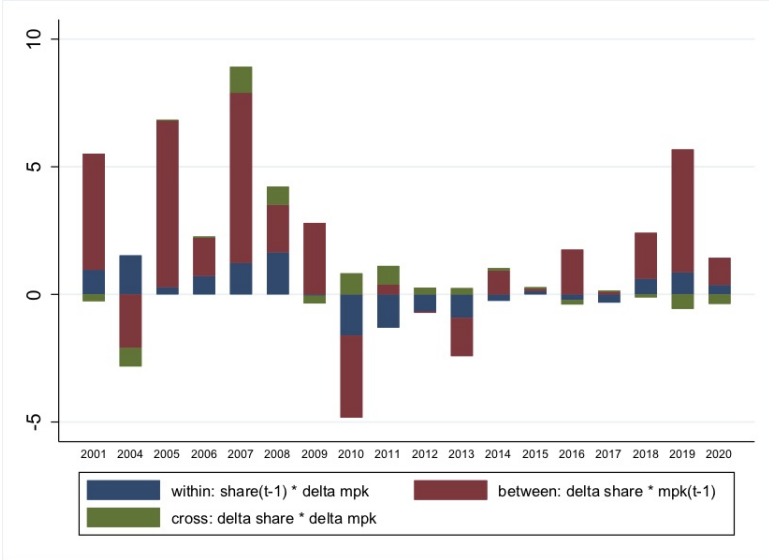


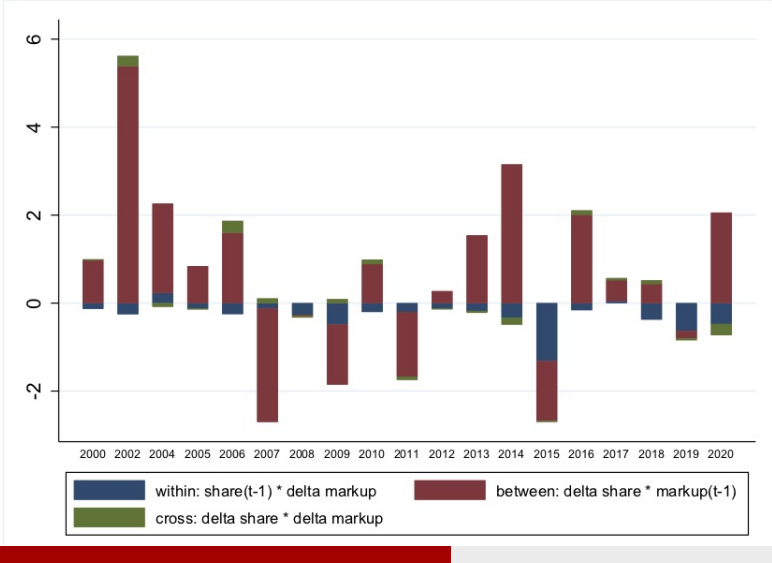


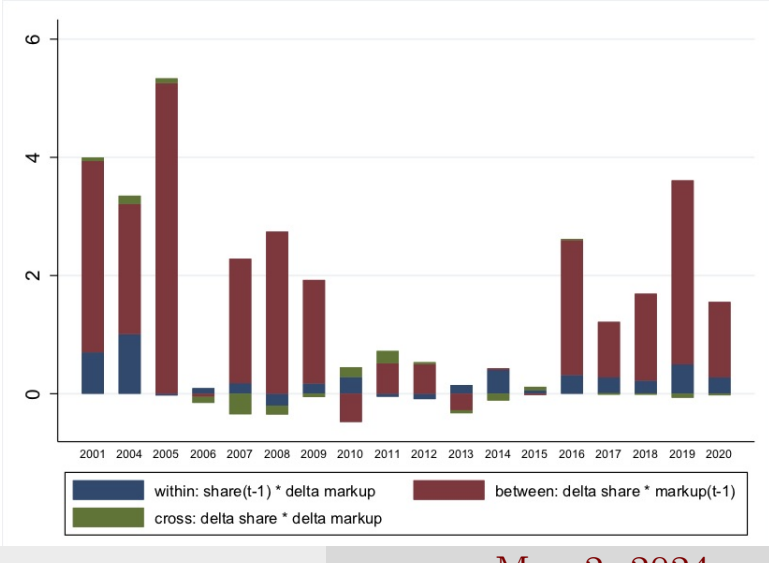
Rising Reallocation to the Top

Between Firm component larger









Capital Investment

Firms that receive more funding invest more several years ahead

	U.S. Firms, Capital Change			
	2 years	3rd year	4th year	5th year
Above Med TFPQ	0.972***	1.135***	0.885**	0.742**
St. Dev.	(0.511)	(0.454)	(0.484)	0.729)
Below Med TFPQ	-0.067	0.282	0.529	0.310
St. Dev.	(0.385)	(0.473)	(0.497)	(0.504)

	Foreign Firms, Capital Change			
Fifth year	2 years	3rd year	4th year	5th year
Above Med TFPQ	0.118	0.503***	0.501***	0.615**
St. Dev.	(0.205)	(0.163)	(0.207)	(0.200)
Below Med TFPQ	0.706**	0.455	0.347	-0.092
St. Dev.	(0.524)	(0.634)	(0.577)	(0.527)

Intangible

Firms that receive more funding invest more in intangible

	U.S. Firms	Foreign Firms
Change in Capex	0.71***	0.58***
St. Dev.	(0.02)	(0.004)
Change in intangible	1.78***	0.30
St. Dev.	(0)	(0.44)

Mark-ups

Firms that receive more funding reduce mark-ups

	U.S. Firms Mark-ups			
	2 years	3rd year	4th year	5th year
Above Med TFPQ	-0,929***	-1.424***	-1.313**	-0.979**
St. Dev.	(0.009)	(0.002)	(0.007)	0.108)
Below Med TFPQ	-0.230	-0.255	-0.635	-0.380
St. Dev.	(0.549)	(0.565)	(0.225)	(0.466)

Horse Race

R^2 for prediction with all 5 variables: 0.3643

U.S. Firms, Liabilities

	MPK	Intangibles	TFP	Distance to Default
Mark-up	0.2708	**0.3729**	0.2815	0.2691
MPK		0.2995	0.2782	0.2684
Intangibles			0.2929	0.3156
TFP				0.2807

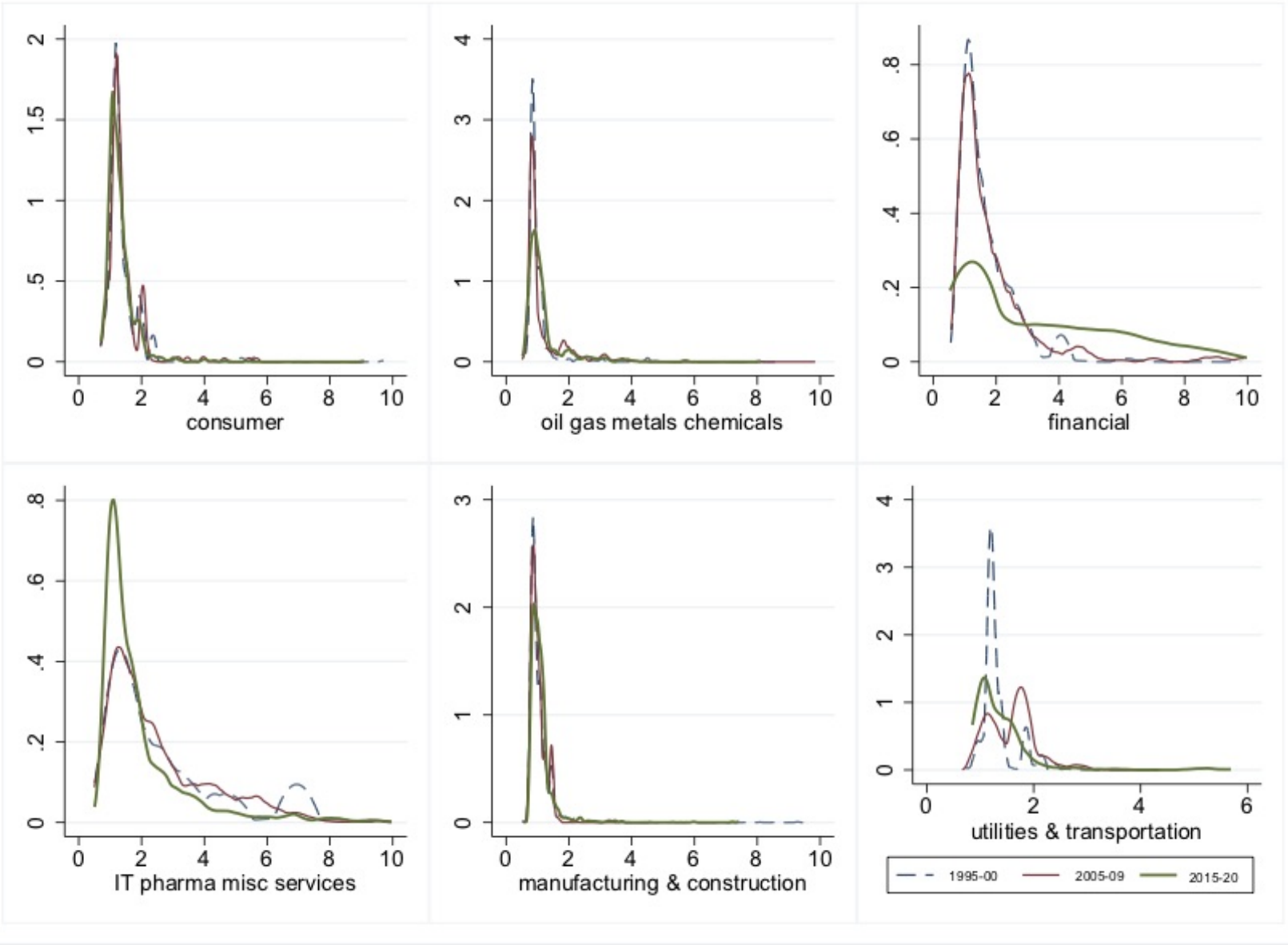
Foreign Firms, Claims

	MPK	Intangibles	TFP	Distance to Default
Mark-up	0.1627	0.179	0.1647	0.1591
MPK		**0.1932**	0.1653	0.1627
Intangibles			0.1787	**0.1917**
TFP				0.1577

Conclusions

- Portfolio Returns are positive, stable: **composition of portfolio differs across countries**
- **Allocation of Shares at the Top of MPK**, contrary to domestic equity: allocative role of capital flows
- U.S. investors allocate to firms **high in intangibles**
- Foreign investors channel capital to U.S. firms with **credit frictions**
- **Reallocation increased over time**

Mark-ups Kernels in TIC: US Firms



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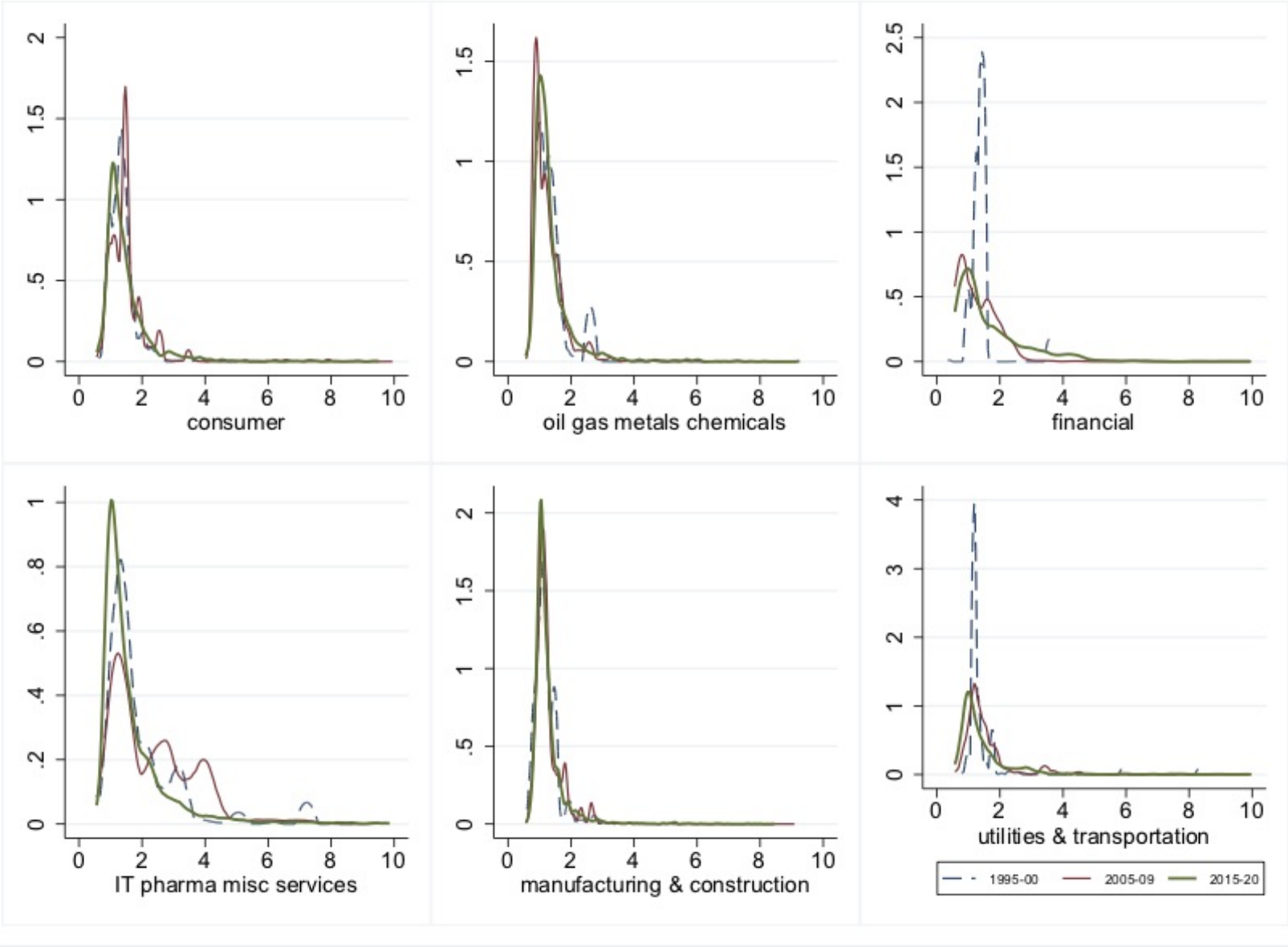
Mark-ups Kernels in TIC: Foreign Firms



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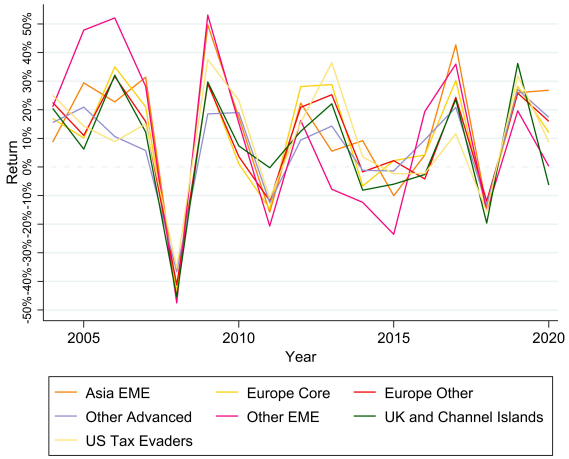
Example of Importance

Table: List of top countries based on nationality reassignment of equities and bonds for 2020. Units are million of dollars

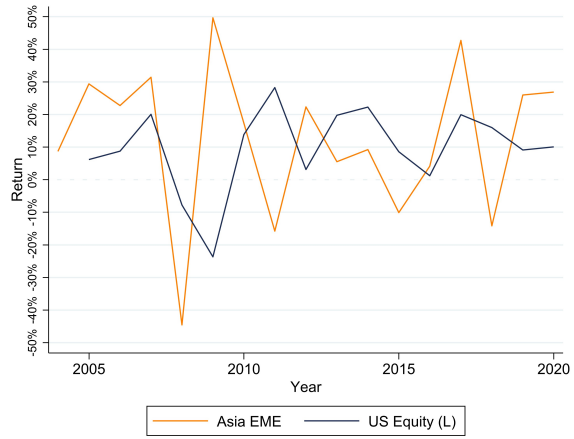
Top countries	Equity reassignment	Top countries	Bonds reassignment
United States	995618	United States	529363
China	766978	China	34040
France	48849	Brazil	26944
Italy	33398	Switzerland	24143
Sweden	30036	Germany	23317
Hong Kong	40954	U. K.	23065
Brazil	23413		

Under nationality correction U.S. investors earn returns in Asia and tax havens back

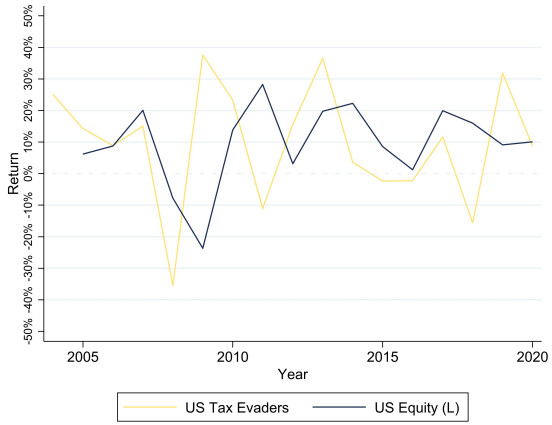
Regional Returns: Asia and Tax Havens



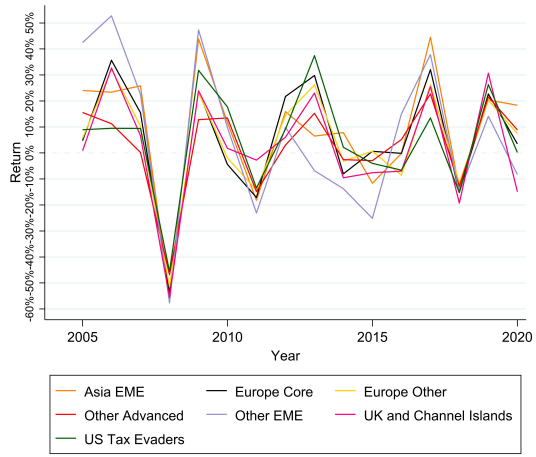
Nationality Equity Returns



Nationality Equity Asia-US



Nationality Equity US-Tax Havens



Nationality Privilege

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The Divergence in the Liabilities

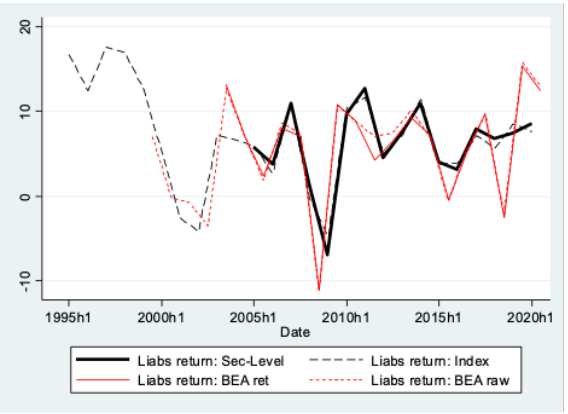

Figure: Liability Dynamic

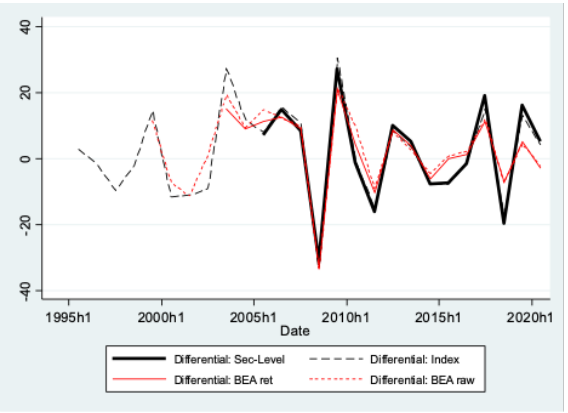

Figure: Differential

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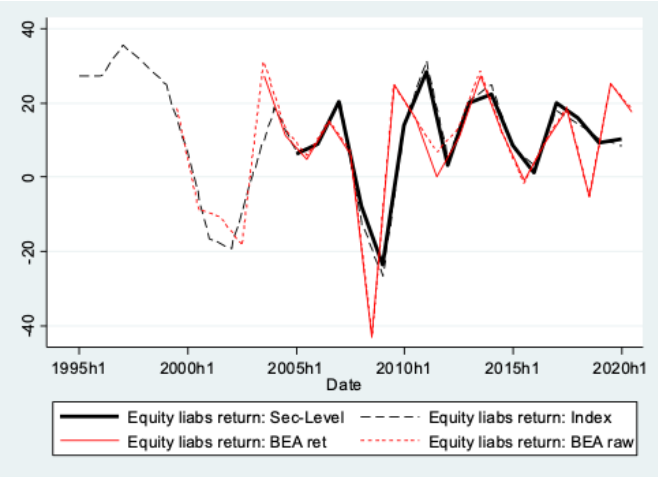
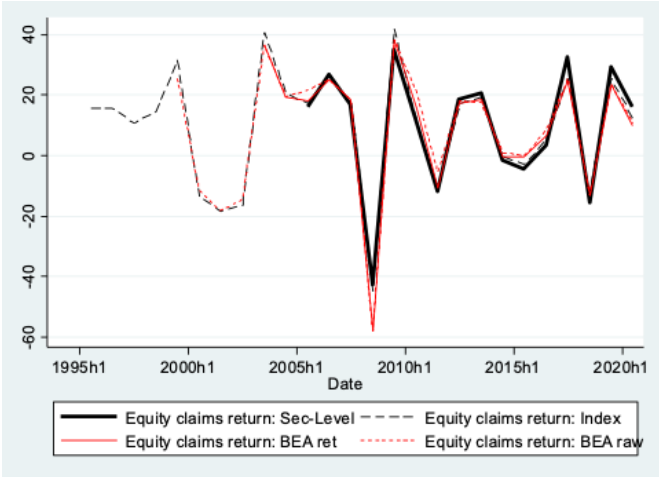
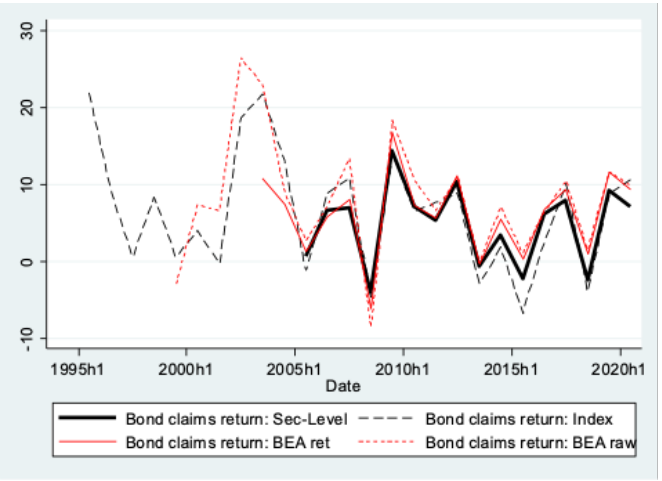
Some Erosion: The Rise in the Cost of Bonds



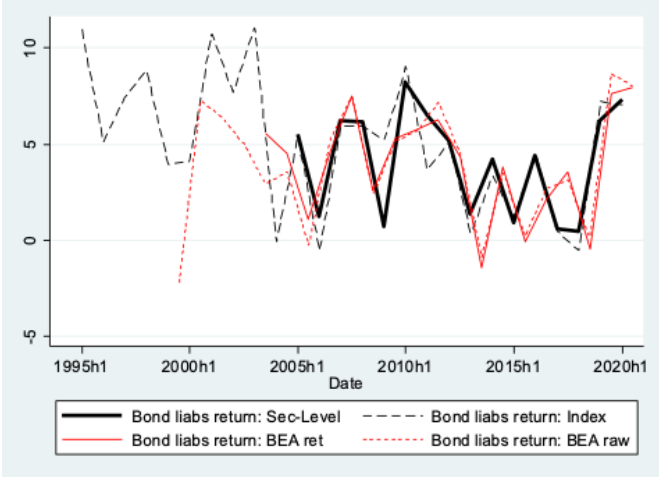
Liability Equity



Claims Equity



Liability Bonds



Claims Bonds

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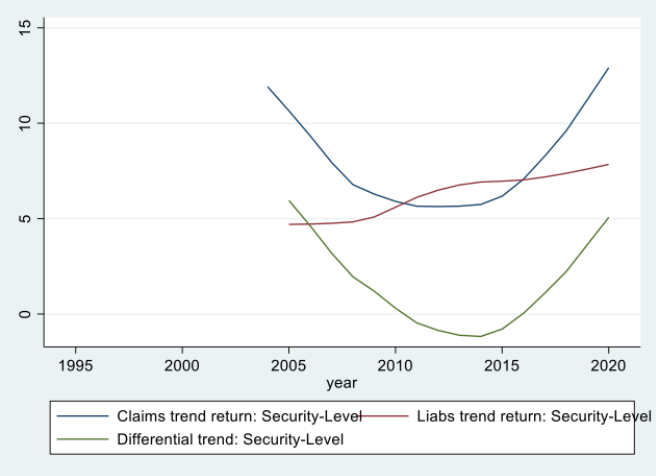
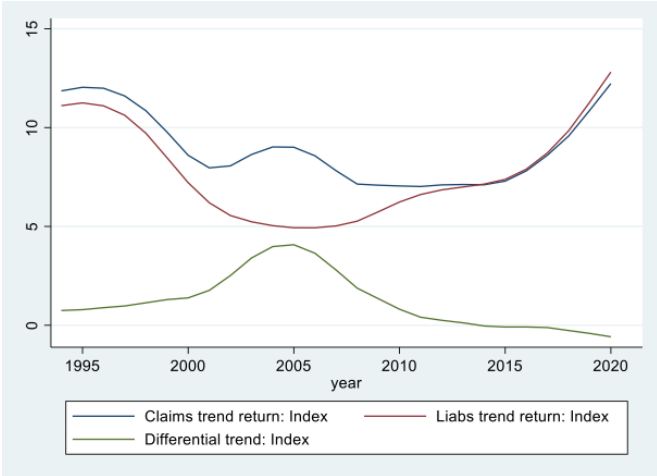
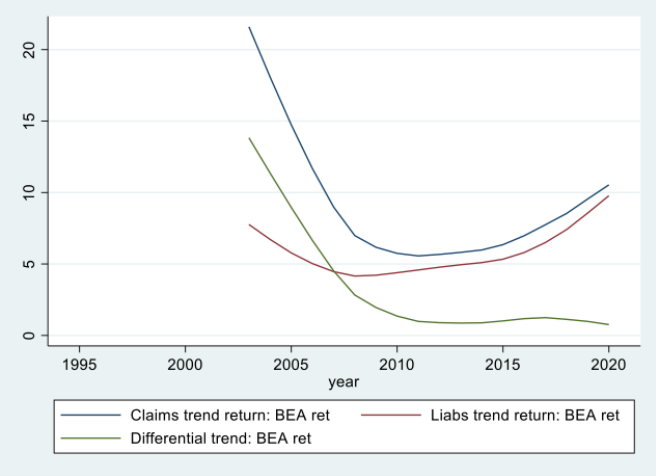
Rising Trends



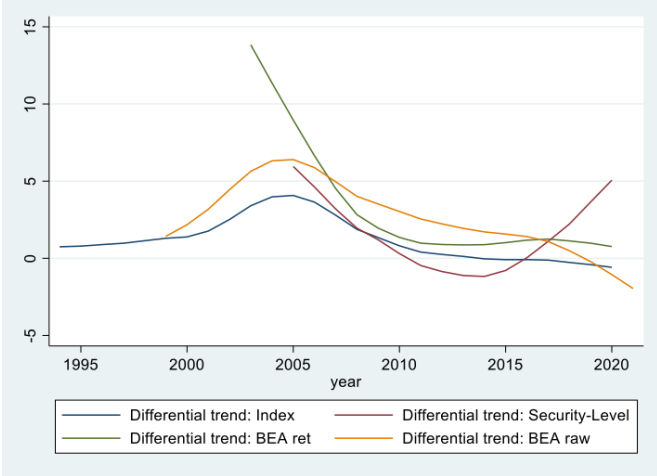
Differential Securities



Differential Index



Differential BEA



Across Methods

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